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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,313	04/28/2008	Samuel S. Murray	38586-330002	4686
1923	7590	02/16/2011	EXAMINER	
MCDERMOTT, WILL & EMERY LLP			ROMEO, DAVID S	
600 13th Street, NW			ART UNIT	PAPER NUMBER
Washington, DC 20005-3096			1647	
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			02/16/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/587,313	<b>Applicant(s)</b> MURRAY ET AL.	
	<b>Examiner</b> David S. Romeo	<b>Art Unit</b> 1647	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,8-23,25,29,32 and 36-49 is/are pending in the application.
- 4a) Of the above claim(s) 8-10,14-21,29,32,36,37 and 44-49 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 is/are allowed.
- 6) ☒ Claim(s) 1-5,12,13,22,25,38-40 and 43 is/are rejected.
- 7) ☒ Claim(s) 23,41 and 42 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

The amendment filed 11/29/2010 has been entered. Claims 1-5, 8-23, 25, 29, 32 and 36-49 are pending.

Claims 8–10, 14–21, 29, 32, 36–37 and 44–49 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 04/19/2010.

**Maintained formal matters, objections, and/or rejections:**

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 22, 25 and 43 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a fragment of SEQ ID NO: 1, wherein said fragment increases the degree or rate of osteogenesis by BMP-2 in mammalian cells, does not reasonably provide enablement for a peptide comprising a fragment of SEQ ID NO: 1 without regard to the structure or function of the fragment. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

### ***Response to Arguments***

Applicants argue that:

...the particular fragments of SEQ ID No: 1 that are embodied in the present invention are those that function, such as to increase the degree or rate of osteogenesis by BMP-2 in mammalian cells, or those that increase the degree or rate of calcification in vertebrate cells, specifically mammalian chondrogenic or osteogenic progenitor cells. ...The term "fragments" as used in the claims refers to fragments that exhibit these functional characteristics. Methods of testing the degree or rate of osteogenesis and calcification as well as the residency time and activity of BMPs are described in the specification, such as in Examples 2 and 4.

...the specification has provided direction as to which particular fragments of SEQ ID No: 1 would be expected to increase the rate or degree of osteogenesis or calcification. BBP is comprised of an amino acid sequence that is similar to the TGF $\beta$ /BMP-binding region of futuin. The amino acid sequence in SEQ ID No: 1 is also similar to the human TGF $\beta$  receptor II. ...Figure 3... shows the similarities in the amino acid sequences of the peptides. One of skill in the art would be able to use this Figure as a guide to determine which peptide fragments would be functional as according to the present invention, and standard techniques to test for activity. ...One of skill in the art would understand, based on the above descriptions, which fragments and modifications of SEQ ID No: 1 would be most likely to function as according to the present invention

Applicants' arguments have been fully considered but they are not persuasive.

The claims are not limited to any particular fragment of SEQ ID NO: 1. Nor are they limited to any fragment having any particular functional characteristic. Rather, the claims encompass any polypeptide comprising any fragment of any size of SEQ ID NO:

1. The breadth of the claims is astronomical. The guidance with respect to particular polypeptides having the desired functional characteristics is limited to the disclosure of SEQ ID NO: 1. Although the specification provides limited, specific guidance regarding a particular peptide, i.e., SEQ ID NO: 1, the guidance and direction regarding any polypeptide comprising any fragment of any size of SEQ ID NO: 1 is lacking and mostly

absent. Although the specification speculates that growth factor binding amino acids reside in the T-section, and therefore, amino acid substitutions in the T-section may effect activity of BBP to a greater extent than substitutions in the B regions (paragraph 0031), none of the working examples varies the sequence of SEQ ID NO: 1.

5 In re Fisher, 427 F.2d 833, 166 USPQ 18 (CCPA 1970) held that

10 Inventor should be allowed to dominate future patentable inventions of others where those inventions were based in some way on his teachings, since such improvements, while unobvious from his teachings, are still within his contribution, since improvement was made possible by his work; however, he must not be permitted to achieve this dominance by claims which are insufficiently supported and, hence, not in compliance with first paragraph of 35 U.S.C. 112; that paragraph requires that scope of claims must bear a reasonable correlation to scope of enablement provided by specification to persons of ordinary skill in the art; in cases involving  
15 predictable factors, such as mechanical or electrical elements, a single embodiment provides broad enablement in the sense that, once imagined, other embodiments can be made without difficulty and their performance characteristics predicted by resort to known scientific laws; in cases  
20 involving unpredictable factors, such as most chemical reactions and physiological activity, scope of enablement varies inversely with degree of unpredictability of factors involved.

In the present case the scope of the claims does not bear a reasonable correlation to the scope of enablement provided by the specification because the guidance and  
25 direction regarding any polypeptide comprising any fragment of any size of SEQ ID NO: 1 is lacking and mostly absent. As shown by decision in Fisher, the judicial interpretation of the first paragraph of 35 U.S.C. § 112 requires that the breadth of the claims must be based upon the predictability of the claimed subject matter and not on some standard of trial and error. To argue that one can make material embodiments of  
30 the invention and then test for those that work in the manner disclosed or that the present claims only encompass the working embodiments is judicially unsound. Unless

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one has a reasonable expectation that any one material embodiment of the claimed invention would be more likely than not to function in the manner disclosed or the present specification provides sufficient guidance to permit one to identify those embodiments which are more likely to work than not without actually making and testing them then the present application does not support the breadth of the claims. In the present case it is highly improbable that any polypeptide comprising any fragment of any size of SEQ ID NO: 1 will more likely than not perform in the manner disclosed and the present specification does not provide the guidance needed for a skilled artisan to predict how to use any polypeptide comprising any fragment of any size of SEQ ID NO: 1. Therefore, it would require undue experimentation for the skilled artisan to make and/or use the full scope of the claimed invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 is indefinite over the recitation of "molecules having sequence similarity to TGF $\beta$ ." Because the instant specification does not identify that material element or combination of elements which is unique to, and, therefore, definitive of "having sequence similarity to TGF $\beta$ ," an artisan cannot determine what additional or material

limitations are placed upon a claim by the presence of this element. The metes and bounds are not clearly set forth.

### ***Response to Arguments***

Applicants argue that:

5                   One of skill in the art would understand that the molecules referred to in claim 5 as "having sequence similarity to TGF $\beta$ " would be those molecules that contain binding domains that are similar to the BMP-2 binding domains.

10                  Applicants' arguments have been fully considered but they are not persuasive.

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Assuming for the sake of argument that

"sequence similarity to TGF $\beta$ " would indicate molecules that contain binding domains that are similar to the BMP-2 binding domains, the metes and bounds of "sequence

15       similarity to TGF $\beta$ " would still not be clearly set forth because there is no clear standard for ascertaining the requisite degree of similarity to either TGF $\beta$  or BMP-2 binding domains.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that  
20       form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

25                  Claims 1–4, 12, 13, 25 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Keifer (U. S. Patent No. 5,620,867).

***Response to Arguments***

Applicants argue that:

First, the protein that Keifer disclosed in Figures 3 and 5 is secreted phosphoprotein-24 (Spp-24), which is not a BMP. See, ...Brochmann 2009... . Keifer thus mischaracterized Spp-24 as a BMP. ...the disclosed sequences are those of the Spp-24 protein, which regulates BMPs. See, e.g., Brochmann 2009....

There is no evidence that Spp-24 increases the rate or degree of osteogenesis or calcification. Rather, studies have shown that the full length Spp-24 molecule, when combined with BMP, completely inhibits bone formation. See ...Brochmann 2010; Brochmann 2009...; Sintuu...2008.

The rejected claims are drawn to a 19 amino acid sequence contained in Spp-24 that binds BMP-2 and functions, such as to increase the rate of osteogenesis or calcification. ...Keifer does not teach a fragment of Spp-24 that binds a BMP and achieves the described functions in the specification. ... Keifer does not disclose the specific 19 amino acid sequence of Spp-24 that binds BMP and increases the rate of osteogenesis or calcification. One of skill in the art practicing the Keifer patent would create a composition containing Spp-24 that inhibits bone growth when combined with a BMP. This the exact opposite of the effect of the claimed invention.

... the protein Keifer identified was not a BMP. There is no evidence that Spp-24 alone stimulates bone growth. ... there is nothing in Keifer that suggests that any fragment of Spp-24 can be combined with BMPs to function as SEQ ID No: 1. Instead, Keifer discloses the use of purified BMP to screen for cartilage or bone growth inhibitors. Keifer '867 patent, col. 12:57-58. Thus, Keifer does not disclose all of the elements in the rejected claims, and does not anticipate them under 102(b).

Applicants' arguments have been fully considered but they are not persuasive.

Brochmann 2010, Brochmann 2009 and Sintuu 2008 are not of record in the present application and the examiner cannot consider evidence that is not of record. The rejected claims are drawn to a peptide comprising the amino acid sequence of SEQ ID NO: 1 or a peptide comprising a fragment of SEQ ID NO: 1. Keifer's BMP comprises



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the amino acid sequence of SEQ ID NO: 1, as indicated in the last Office action.

Therefore, Keifer discloses a peptide comprising SEQ ID NO: 1, a peptide comprising any fragment of SEQ ID NO: 1, and a peptide comprising a fragment of SEQ ID NO: 1, wherein the fragment increases the degree or rate of calcification in cells or increases

5 the degree or rate of osteogenesis by BMP-2. It is immaterial what Keifer calls the disclosed peptide or how Keifer characterizes the disclosed peptide because a chemical composition and its properties are inseparable. Where the claimed and prior art products are identical in structure or composition claimed properties or functions are presumed to be inherent. The claims do not require that the claimed peptide increase  
10 the rate or degree of osteogenesis or calcification. The claims only require a peptide comprising: SEQ ID NO: 1, any fragment of SEQ ID NO: 1, or any fragment of SEQ ID NO: 1 that increases the rate or degree of osteogenesis or calcification. Insofar as Keifer discloses a peptide comprising the amino acid sequence of SEQ ID NO: 1, then Keifer discloses: a peptide comprising the specific 19 amino acid sequence of Spp-24  
15 wherein the specific 19 amino acid sequence binds BMP and increases the rate of osteogenesis or calcification, a peptide comprising any fragment of SEQ ID NO: 1, and a peptide comprising any fragment of SEQ ID NO: 1 wherein the fragment increases the rate or degree of osteogenesis or calcification, binds a BMP and achieves the described functions in the specification. To argue otherwise is to argue that applicant's have not  
20 enabled the fragment.

Claims 1–4, 12, 13, 22, 25 and 38–40 are rejected under 35 U.S.C. 102(b) as being anticipated by Price (WO 96/21006).

***Response to Arguments***

Applicants argue that:

5           ... Price, like Keifer, teaches the use of the entire Spp-24 protein, not the BBP peptide portion of the protein. ... the full Spp-24 protein will act to completely inhibit BMP-2 activity. See Bochmann, 2009, ...; Bochmann 2010, ...; Sintuu, .... ...the claimed BBP peptide will increase BMP-2  
10           activity. Price does not disclose the use of the specific 19 amino acid fragment comprising BBP that will function as SEQ ID No. 1. As such, Price does not anticipate the claimed peptide.

15           ... Price discloses the use of the Spp-24 protein as a protease-inhibitor. the claimed BBP peptide binds to BMP and functions, such as to increase the rate or degree of osteogenesis or calcification. Thus, the claimed BBP peptide is believed to regulate a different bone development process than the Spp-24 protein disclosed by Price.

Applicants' arguments have been fully considered but they are not persuasive.

20   Brochmann 2010, Brochmann 2009 and Sintuu 2008 are not of record in the present application and the examiner cannot consider evidence that is not of record. The rejected claims are drawn to a peptide comprising the amino acid sequence of SEQ ID NO: 1 or a peptide comprising a fragment of SEQ ID NO: 1. Price's peptide comprises the amino acid sequence of SEQ ID NO: 1, as indicated in the last Office action.

25   Therefore, Price discloses a peptide comprising SEQ ID NO: 1, a peptide comprising any fragment of SEQ ID NO: 1, and a peptide comprising any fragment of SEQ ID NO: 1 wherein the fragment increases the degree or rate of calcification in cells or increases the degree or rate of osteogenesis by BMP-2. It is immaterial how Price characterizes the disclosed peptide because a chemical composition and its properties are

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inseparable. Where the claimed and prior art products are identical in structure or composition claimed properties or functions are presumed to be inherent. The claims do not require that the claimed peptide increase the rate or degree of osteogenesis or calcification. The claims only require a peptide comprising: SEQ ID NO: 1, any  
5 fragment of SEQ ID NO: 1, or any fragment of SEQ ID NO: 1 that increases the rate or degree of osteogenesis or calcification. Insofar as Price discloses a peptide comprising the amino acid sequence of SEQ ID NO: 1, then Price discloses: a peptide comprising the specific 19 amino acid sequence of Spp-24 wherein the specific 19 amino acid sequence binds BMP and increases the rate of osteogenesis or calcification, a peptide  
10 comprising any fragment of SEQ ID NO: 1, and a peptide comprising any fragment of SEQ ID NO: 1 wherein the fragment increases the rate or degree of osteogenesis or calcification, binds a BMP and achieves the described functions in the specification. To argue otherwise is to argue that applicant's have not enabled the fragment.

### ***Conclusion***

15 Claim 11 is allowable. Claims 23, 41 and 42 are objected to as being dependent upon a rejected base claim.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE  
20 MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5 ANY INQUIRY CONCERNING THIS COMMUNICATION OR EARLIER COMMUNICATIONS FROM THE EXAMINER SHOULD BE DIRECTED TO DAVID S. ROMEO WHOSE TELEPHONE NUMBER IS (571) 272-0890. THE EXAMINER CAN NORMALLY BE REACHED ON MONDAY THROUGH FRIDAY FROM 9:00 A.M. TO 5:30 P.M. IF ATTEMPTS TO REACH THE EXAMINER BY TELEPHONE ARE UNSUCCESSFUL, THE EXAMINER'S SUPERVISOR, JEFFREY STUCKER, CAN BE REACHED AT (571)272-0911.

10 IF SUBMITTING OFFICIAL CORRESPONDENCE BY FAX, APPLICANTS ARE ENCOURAGED TO SUBMIT OFFICIAL CORRESPONDENCE TO THE CENTRAL FAX NUMBER FOR OFFICIAL CORRESPONDENCE, WHICH IS (571) 273-0835.

CUSTOMERS ARE ALSO ADVISED TO USE CERTIFICATE OF FACSIMILE PROCEDURES WHEN SUBMITTING A REPLY TO A NON-FINAL OR FINAL OFFICE ACTION BY FACSIMILE (SEE 37 CFR 1.6 AND 1.8).

15 ANY INQUIRY OF A GENERAL NATURE OR RELATING TO THE STATUS OF THIS APPLICATION OR PROCEEDING MAY BE OBTAINED FROM THE PATENT APPLICATION INFORMATION RETRIEVAL (PAIR) SYSTEM. STATUS INFORMATION FOR PUBLISHED APPLICATIONS MAY BE OBTAINED FROM EITHER PRIVATE PAIR OR PUBLIC PAIR. STATUS INFORMATION FOR UNPUBLISHED APPLICATIONS IS AVAILABLE THROUGH PRIVATE PAIR ONLY. FOR MORE INFORMATION ABOUT THE PAIR SYSTEM, SEE [HTTP://PAIR-DIRECT.USPTO.GOV](http://PAIR-DIRECT.USPTO.GOV). CONTACT THE ELECTRONIC BUSINESS CENTER (EBC) AT 866-217-9197 (TOLL-FREE) FOR QUESTIONS ON ACCESS TO THE PRIVATE PAIR SYSTEM,

20 /DAVID S ROMEO/  
PRIMARY EXAMINER, ART UNIT 1647

DSR  
FEBRUARY 1, 2011

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